

Tennessee Pollution Prevention Partnership Success Story



Bridgestone Firestone NT, LLC - Warren
725 Bridgestone Drive
Morrison, Tennessee 37257
931-668-5600
www.bridgestone-firestone.com



Replacement of Nickel Cadmium Batteries with Fuel Cells

The Member

Bridgestone/Firestone North American Tire, LLC, Warren County (BFNT Warren) plant began manufacturing truck and bus tires in 1990. The plant employs approximately 1025 team members involved in producing thousands of truck and bus tires each day. BFNT company-wide has been dedicated to environmental excellence and continuous improvement as demonstrated by all of our North American tire plants achieving ISO 14001 certification by the year 2000. BFNT Warren is also a Charter Member of the EPA National Environmental Performance Track. We continue to look for opportunities to eliminate and reduce waste, save natural resources, and prevent pollution.

The Story

At BFNT Warren, most of the production vehicles are powered by batteries. The automatic guided vehicles (AGVs) carry "green" tires to the curing presses. Green tires are tires of uncured rubber that have been assembled at the tire assembly machines. The AGVs operate 24 hours per day, 350 days per year and use nickel cadmium batteries for power. These batteries contain 99.5% (1,974 pounds) of the cadmium used or stored at the facility. The electricity used to keep the batteries charged generates 2,164 tons of carbon dioxide emissions per year. The AGVs with batteries must stop and charge for 7 minutes for every 40 minutes while the AGVs with hydrogen fuel cells must stop and fuel up for 5 minutes for every 24 hours. AGVs with batteries eventually slow down before the charge time and back up the other AGVs with higher battery charges. These low battery charge conditions cause electrical component failures in boards and motors. Hydrogen fuel cells operate at continual

optimal voltage keeping the AGVs running full speed and reduce maintenance costs for AGV circuit boards and electric motors.

The Success

BFNT Warren is committed to continuous improvement in our production methods and environmental performance. By substituting the nickel cadmium batteries with hydrogen fuel cells we have:

- Reduced the cadmium used at the facility from 1985 pounds to 863 pounds (56% reduction) with plans to recycle the unused batteries in 2007.
- Reduced carbon dioxide emissions associated with charging the AGV batteries from 2,164 tons/year to 1,668 tons/year (23% reduction). We plan to replace the remaining AGV batteries with hydrogen fuel cells in 2007.
- Using hydrogen fuel cells in 11 of 30 AGVs reduced AGV maintenance parts cost by \$7,500 in January 2007. Estimated annual cost savings of \$90,000.
- With the increased efficiency of the 11 AGVs with hydrogen fuel cells, BFNT Warren did not purchase an additional AGV for \$320,000 to keep up with production increases.

The Pollution Prevented

In 2006, BFNT Warren replaced the nickel cadmium batteries in 11 of 30 AGVs reducing the cadmium used by 1,122 pounds (56%) and carbon dioxide emissions associated with AGVs by 496 tons (23%).

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